

REMARKS

Status of the Application

In the Non-Final Office Action dated September 12, 2007, Claims 1 and 6-12 were rejected. In the present response, Claims 1 and 6 have been amended. Support for these amendments can be found in original Claim 2 and Examples 1-8 of the present application. Claims 2-5 were previously withdrawn. Thus, Claims 1 and 6-12 are pending. No new matter was added.

Rejections Under 35 U.S.C. § 112

Examiner rejected Claims 1 and 6-12 under 35 U.S.C. § 112, 2nd paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as his invention. Specifically, Examiner asserts that “grafted polyphenylene ether resin” in Claim 1 is indefinite as to scope and meaning, that the word “containing” in Claim 1 conflicts with the antecedently recited narrower language “consisting essentially of,” and that there is no antecedent basis for the PEKK species of Claim 6. In the present response, Claim 1 has been amended to remove the Markush group of possible thermoplastics, thereby obviating the first and last of these rejections. Claim 1 was further amended to replace the language “consisting essentially of” with “comprising,” thereby obviating the remaining rejection. Applicants therefore respectfully request that these rejections be withdrawn.

Rejections Under 35 U.S.C. § 103(a)

Claims 1 and 6-12 were further rejected under 35 U.S.C. § 103(a) as obvious in view of U.S. Patent No. 5,789,523 to George et al. (hereinafter “George”). More specifically, Examiner asserts that George discloses a polyimide composition comprising 70-99.9% by weight of at least one polyimide, or a blend of at least one polyimide with from 45-79.9% by weight of a melt-processible polymer, and from 0.1-30% by weight of at least one sheet silicate, such as mica. Examiner further asserts that George discloses the possible

addition of graphite to increase the composition's wear resistance and carbon fiber to reduce the composition's coefficient of thermal expansion. Examiner concludes that, if one skilled in the art selected the embodiment of George employing the melt-processible polymer/polyimide blend and further selected mica, graphite, and carbon fiber to employ with that melt-processible polymer/polyimide blend, one could arrive at the present invention, thereby making the present invention obvious in view of George. However, while Applicant in no way admits that Claims 1 and 6-12 in their previous form were obvious in view of George, Claim 1, upon which all other rejected claims rely, has been amended to include an additional limitation which obviates this rejection.

Claim 1 has been amended to include a limitation requiring that the sum amount of thermoplastic, graphite, carbon fiber, and mica in the composition is at least 85% by weight of the total composition. Thus, compositions meeting the limitations of Claim 1 can only possess 15% by weight, at most, of a component other than thermoplastic, graphite, carbon fiber, and mica. In contrast, George requires that the composition contains at least 20% by weight of a polyimide. While discussing a composition that contains no melt-processible polymer part, George states that the composition is to contain "from about 70-99.9 weight percent of at least one polyimide" (George at 2:28-29). Similarly, while discussing compositions of the invention which do possess a melt-processible polymer part, George states that the compositions of the invention contain "20-30 weight percent of at least one polyimide" (George at 2:36). Thus, George discloses only compositions containing at least 20% by weight of a polyimide.

However, as argued by Applicant in a previous Response, the disclosure of George also demonstrates that the polyimide therein disclosed is not a melt-processible polymer and therefore does not meet the definition of a thermoplastic of Claim 1 of the present invention (see May 17, 2005, Response at page 4). This argument was accepted by Examiner in the subsequent Office Action as evidenced by Examiner's statement that "Applicant's arguments filed May 17, 2005 have been fully considered and are persuasive to the extent that the rejection over George et al has been withdrawn" (August 4, 2007, Office Action at page 4). Further evidence of Examiner's acceptance of Applicant's position can

be found in the fact that Examiner has failed to put forth any argument or assertion to the contrary since that response despite the multitude of communications which have taken place between May 17, 2005, and the present. Moreover, in the most recent Office Action, Examiner recognizes that George's polyimide is not a thermoplastic of Claim 1 of the present application. While discussing George's Example 29, which contains polyimide but no melt-processible polymer part, Examiner stated that "the example of George et al differs from the present claims in not expressly exemplifying a melt processible resin" (September 12, 2007, Office Action at page 3). Thus, as George requires the addition of at least 20% by weight of a component which is not thermoplastic, graphite, carbon fiber, or mica, George necessarily only discloses compositions containing a sum total amount of thermoplastic, graphite, carbon fiber, and mica of 80% by weight or less. Because amended Claim 1 of the present application requires the compositions claimed therein to possess at least 85% by weight of these components, George fails to teach the present invention, thereby making the present invention nonobvious in view of this reference.

In addition to this failure to teach compositions of the present invention, George fails to even suggest the possibility of reducing the amount of polyimide to arrive at compositions of the present invention, and even teaches away from such a reduction, again demonstrating the nonobviousness of the present application. As an initial matter, nowhere in George is polyimide in an amount less than 20% even mentioned. Further, George actually teaches away from employing reduced amounts of polyimide to arrive at compositions possessing a reduced coefficient of friction. For example, Table III of George presents coefficient of friction results for several compositions containing varying amounts of polyimide and a silicate additive. In this Table, Example 30, which contains 28.5% polyimide and 5% silicate, is shown to have a coefficient of friction ranging from 0.41-0.7, while Example J, which contains the same 5% silicate but no polyimide, is shown to have a coefficient of friction so high that the test sample was destroyed before coefficient of friction results could even be obtained. This demonstrates that reducing the amount of polyimide employed in the George invention resulted in a greatly increased coefficient of friction. Thus, one skilled

in the art would not have been motivated by the disclosure of George to reduce the amount of polyimide employed to arrive at the present invention's compositions possessing improved coefficients of friction but which contain at least 85% by weight of thermoplastic, graphite, carbon fiber, and mica. This again demonstrates that the present application is nonobvious in view of George.

For all of the above reasons, Applicant contends that Claim 1 of the present application is nonobvious in view of George. As all other claims are dependent upon, and narrower than Claim 1, all claims of the present application should be deemed nonobvious in view of this reference. Applicant therefore respectfully requests that these rejections be withdrawn.

Examiner further rejected Claims 1 and 6-12 under 35 U.S.C. § 103(a) as obvious in view of U.S. Patent No. 5,844,036 to Hughes (hereinafter "Hughes") for the reasons previously set forth on the record. More specifically, in prior Office Actions Examiner asserts that Examples G and H of Hughes teach compositions containing thermoplastic, graphite, and carbon fiber, as well as calcium terephthalate as an immobilizing filler. Examiner further asserts that, given the disclosure of the class of compounds suitable for use as an immobilizing filler, it would have been obvious to one skilled in the art to substitute mica for calcium terephthalate. Moreover, while Examiner admits that Hughes fails to disclose that compositions disclosed therein possess a coefficient of friction of 0.20 or less, as is required by Claim 1 of the present invention, Examiner asserts that "[w]hile patentees may not expressly disclose [a coefficient of friction of 0.20 or less], they do recognize that graphite confers lubricity and wear resistance properties to their composition and, as such, the presently claimed coefficient of friction property would appear to flow naturally from following the suggestion of the prior art," which Examiner asserts makes the present invention obvious. However, Applicants respectfully disagree with Examiner's assertions.

First, Applicant contends that the present invention is not obvious in view of Hughes because Hughes fails to disclose the particular compositions of the present invention. Nowhere in Hughes is a composition containing thermoplastic, graphite, carbon fiber, and mica specifically mentioned. While Hughes does

specifically disclose in the Examples compositions possessing a combination of some of these materials, no one Example possesses all of the components required by Claim 1 of the present application (see Hughes at Table 1). Further, while some of the Hughes Examples do employ mica as the immobilizing filler (i.e., Examples C and D), whenever graphite is combined with an immobilizing filler, mica is never employed, but rather only calcium terephthalate is used (i.e., Examples G and H). Given such a disclosure of the use of mica only in the absence of graphite, the disclosure of Hughes actually appears to teach away from a combination of graphite with mica, as is claimed in the present application. Therefore, Hughes fails to make the present invention obvious.

Further, Hughes nowhere suggests that compositions meeting the limitations of Claim 1 of the present application would have reduced coefficients of friction, again demonstrating the nonobviousness of the present invention. Though Hughes does disclose the inclusion of carbon fiber in a thermoplastic composition, this is not done to provide an improved coefficient of friction, but rather Hughes suggests adding carbon fiber "to strengthen the composite" (Hughes at 6:49-50). Similarly, Hughes does not suggest the use of mica or graphite immobilizing filler to decrease the coefficient of friction of the resulting compositions, but rather "to provide additional surface area or volume in the composition" (Hughes at 6:63-67). Further, while Hughes does mention that graphite can be added to enhance lubrication, it does not suggest the use of graphite in conjunction with both mica and carbon fiber in the amounts claimed in the present application to produce compositions with reduced coefficients of friction. Thus, Hughes does not even suggest the inclusion of carbon fiber, mica, and graphite to arrive at compositions with improved friction properties, again demonstrating the nonobviousness of the present invention.

In addition, Hughes does not teach or even suggest compositions with a coefficient of friction of 0.20 or less, as are claimed in the present application, which further demonstrates the present application's nonobviousness. While Examiner admits that Hughes contains no specific disclosure of coefficients of friction of 0.20 or less, Examiner asserts that this limitation of Claim 1 of the present invention is nonetheless obvious. In making this assertion, Examiner

states at page 3 of the May 3, 2007, Office Action that "[w]hile patentees may not expressly disclose [a coefficient of friction of 0.20 or less], they do recognize that graphite confers lubricity and wear resistance properties to their composition and, as such, the presently claimed coefficient of friction property would appear to flow naturally from following the suggestion of the prior art," and thereby finds the present invention obvious. However, the reduced coefficient of friction of the present invention does not "flow naturally from following the suggestion of the prior art," but rather only appears to exist in the specific compounds claimed in the present invention. Of the four samples tested in the present application that include graphite and the fillers of Hughes (Application at Table 2, samples 18 and 25, containing carbon fiber and graphite, and samples 30 and 35, containing carbon fiber, mica, and graphite), only those meeting the limitations of the Claim 1 of the present invention consistently have coefficients of friction of 0.20 or less. The samples containing carbon fiber and graphite but no mica, which follow the suggestion of Hughes but do not meet the limitations of Claim 1, only had a coefficient of friction of 0.20 or less in two out of the four tests performed. In contrast, the samples containing carbon fiber, mica, and graphite had a coefficient of friction of 0.20 or less in all four of the tests performed. Moreover, the samples following the suggestion of Hughes but not meeting the limitations of Claim 1 of the present application (i.e., samples 18 and 25, which contain carbon fiber and graphite but no mica) had an average coefficient of friction greater than three times higher than those meeting the limitations of Claim 1 (i.e., samples 30 and 35). Thus, the reduced coefficient of friction of the compositions of the present invention does not "flow naturally from following the suggestion of the prior art," since many compositions following these suggestions do not have a coefficient of friction of 0.20 or less. Instead, low coefficients of friction were surprisingly and advantageously found to exist only in the specific compositions claimed in the present application, thereby demonstrating the nonobviousness of the invention of Claim 1.

For all of the above reasons, Applicant contends that Claim 1 of the present application is nonobvious in view of Hughes. As all other claims are dependent upon, and narrower than Claim 1, all claims of the present application

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should be deemed nonobvious. Applicant therefore respectfully requests that these rejections be withdrawn and all claims allowed.

CONCLUSION

In view of the foregoing amendments and remarks, Applicants submit that this application is in condition for allowance. In order to expedite disposition of this case, Examiner is invited to contact Applicants' representative at the telephone number below to resolve any remaining issues. Should there be a fee due which is not accounted for, please charge such fee to Deposit Account No. 501447 (Potter Anderson & Corroon LLP).

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